A PROTECTED ANTIPODE CIRCLE (PAC) AT THE CENTER OF THE MOON FARSIDE

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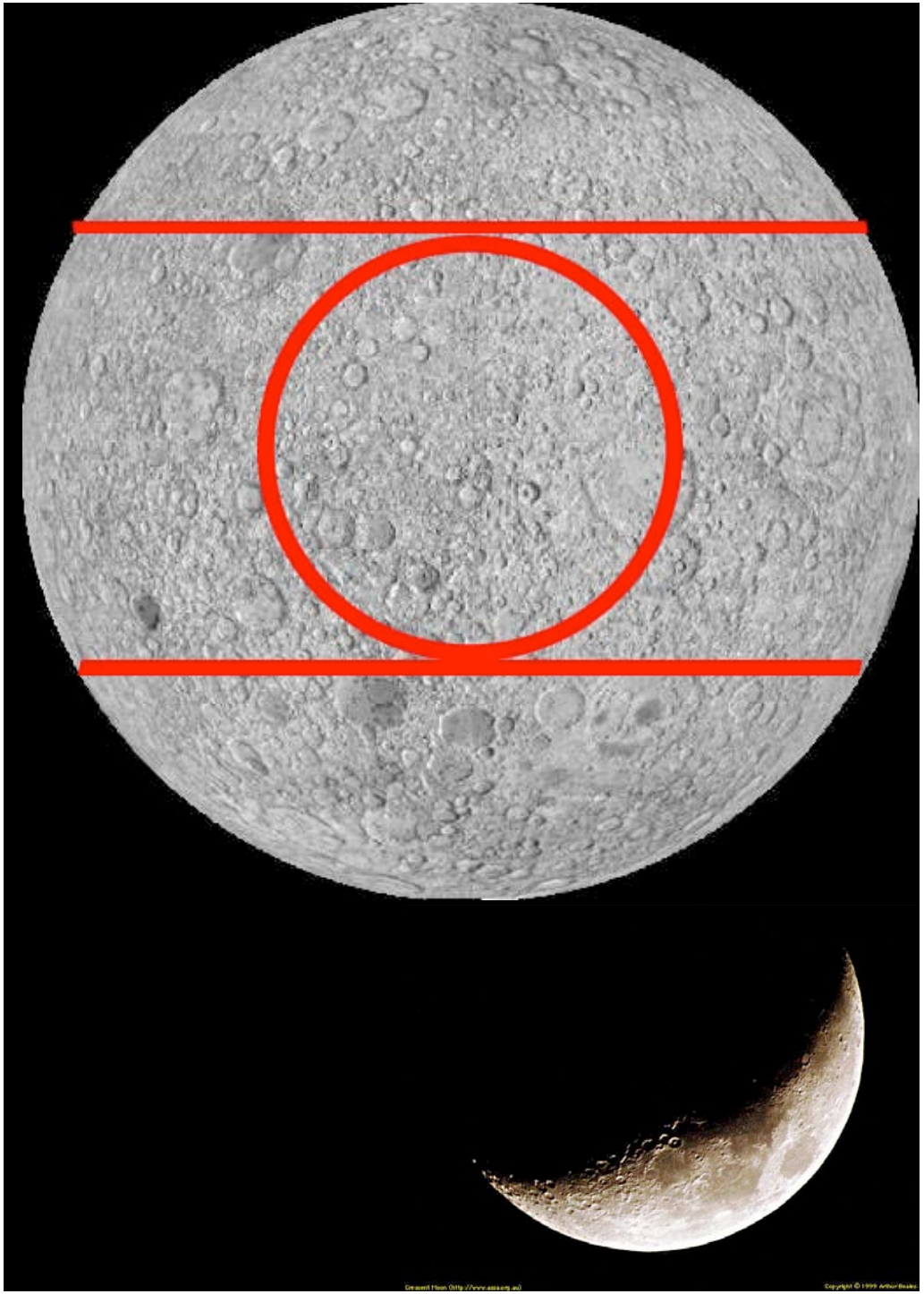
PAC: Protected Antipode Circle.

It is a circular piece of land, 1820 km = 1131 miles across in diameter along the Moon surface on the Farside of the Moon. We propose it to be reserved for scientific purposes only.

PAC is tangent to two Parallels: ±30° in latitude, North and South.

At the center of PAC is the Antipode of the Earth (on the equator and at 180 deg in longitude). Near to the Antipode is crater Daedalus, an 80 km crater proposed by the author in 2005 as the best location for the future Lunar Farside Radio Lab.

Inside Daedalus, the expected attenuation of the man-made RFI (Radio Frequency Interference) coming from the Earth is of the order of 100 dB or higher.



PAC is a consequence of the

Lunar Farside Radio Lab

"Cosmic Study"
of the International Academy of Astronautics (IAA) (1994-2005)

Now extended into
Cosmic Study 1.6
of the IAA

Timeline For That "Cosmic Study"

- 1994 – Jean Heidmann proposes SETI observatory in Farside Saha Crater with link to nearside Mare Smythii plain and then to Earth
- 1994 Lunar Farside Study Sub-committee established within IAA SETI Committee
- 1996 – IAA approves Cosmic Study concept
- 1998 – COSPAR meeting to solicit ideas
- 2000 – Heidmann dies, Maccone takes over
- 2001 – Meeting at JPL
- 2003 – Cosmic Study presented to IAA
- **2005 – Publication of the Cosmic Study in:**

Acta Astronautica, Vol. 56, pp. 629-639.

2008 paper by author about PAC (Acta Astronautica 63 (2008), 110-118)

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Protected antipode circle on the Farside of the Moon

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Abstract

The international scientific community, and especially the IAA (International Academy of Astronautics) have long been discussing the need to keep the Farside of the Moon free from man-made RFI (radio frequency interference). In fact, the center of the Farside, specifically crater Daedalus, is ideal to set up a future radiotelescope (or phased array) to detect radio waves of all kinds that are impossible to detect on Earth because of the ever-growing RFI.

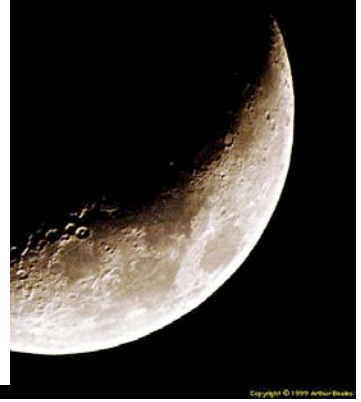
Nobody, however, seems to have established a precise border for the circular region around the antipode of the Earth (i.e. zero latitude and 180° longitude both East and West) that should be Protected from wild human exploitation when several nations will have reached the capability of easy travel to the Moon.

In this paper we propose the creation of PAC, the Protected Antipode Circle, centered around the antipode on the Farside and spanning an angle of 30° in longitude, in latitude and in all radial directions from the antipode.

There are sound scientific reasons for this:

(1) PAC is the only area of the Farside that will never be reached by the radiation emitted by future human space bases located at the L4 and L5 Lagrangian points of the Earth–Moon system;
(2) PAC is the most shielded area of the Farside, with an expected attenuation of man-made RFI of 100 dB or higher;
(3) PAC does not overlap with other areas of interest to human activity except for a minor common area with the Aitken Basin, the southern depression supposed to have been created 3.8 billion years ago during the "big wham" between the Earth and the Moon.

In view of these unique features, we propose PAC to be officially recognized by the United Nations as an International Protected Area, where no radio contamination by humans will possibly take place now and in the future for the benefit of all humankind.



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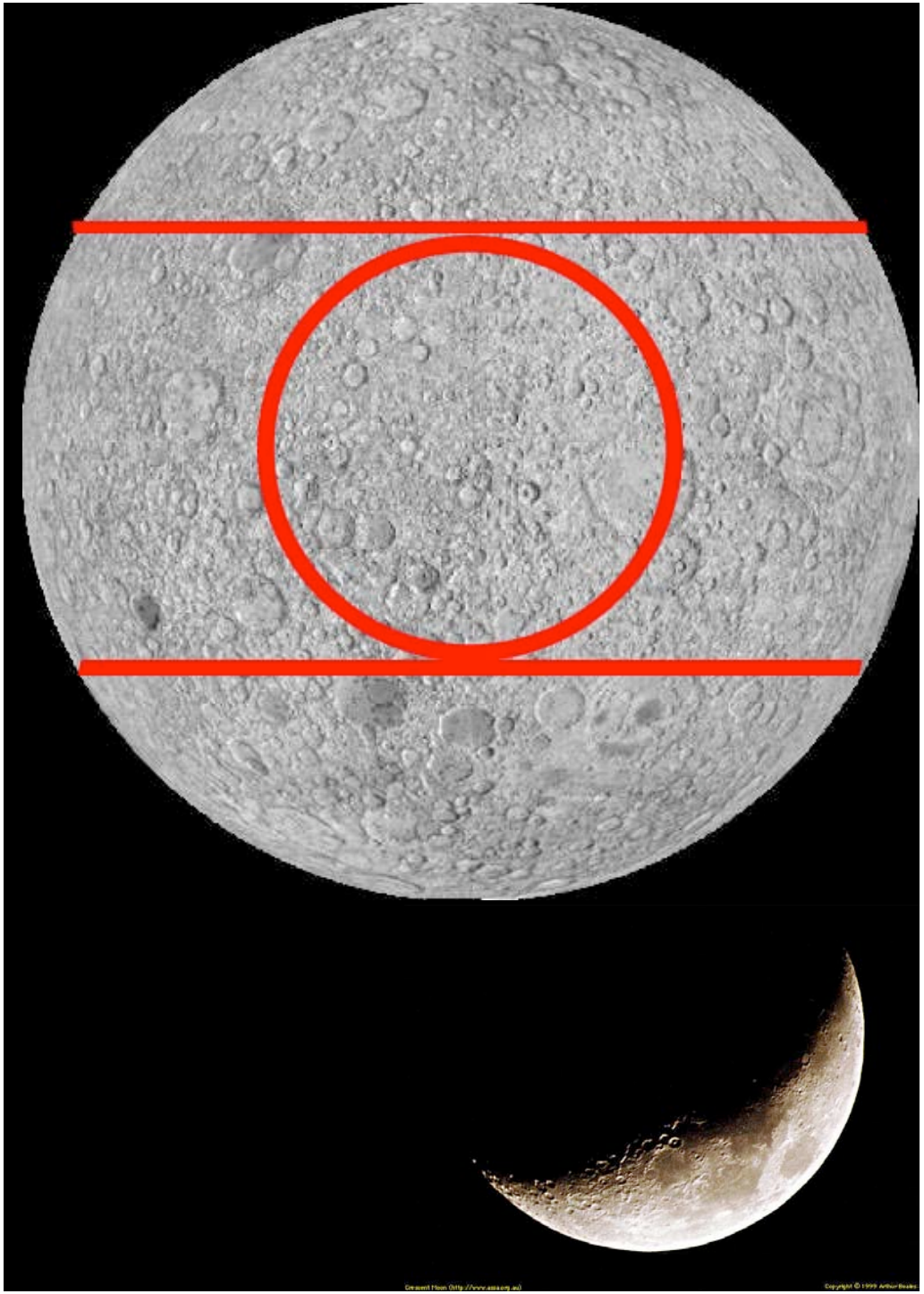
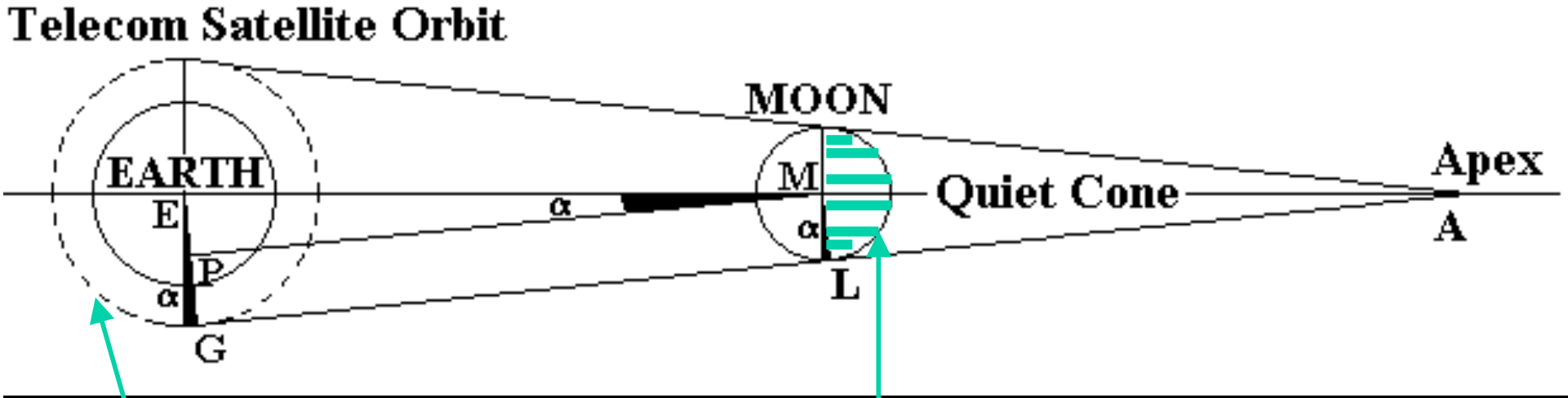


Shielded Zone of the Moon

ITU Radio Regulations Article S22



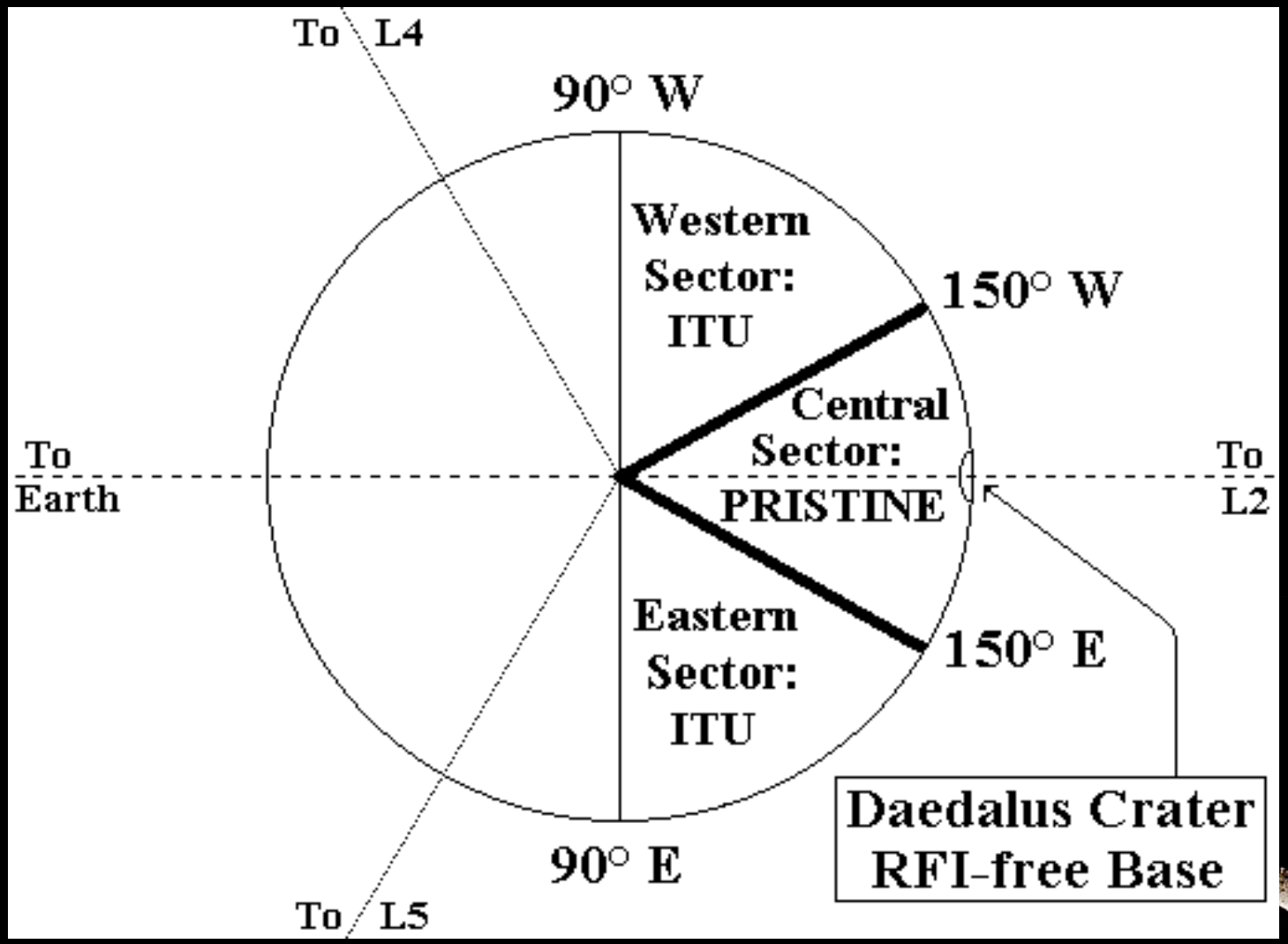
If this is 100,000 km orbit

Then this is the ITU Shielded Zone of the Moon

Daedulus Crater Is Proposed

- Formerly I.A.U. Crater No. 308
- 179 degrees east longitude
- 5.5 degrees south latitude
- 80 km diameter

Three Zones On Farside
"Sharing The Farside By Thirds"



ATTENUATION of man-made RFI at the Daedalus Crater (~ Antipode)

Frequency of radio waves	f = 100 kHz	f = 100 MHz	f = 100 GHz
Source in GEO	- 42 dB	- 72 dB	- 102 dB
Source in an orbit passing through the L1 point	- 30 dB	- 60 dB	- 90 dB
Source still at L4 or L5 Lagrangian points	- 29 dB	- 59 dB	- 89 dB

ATTENUATION of man-made RFI at the Daedalus Crater (~ Antipode)

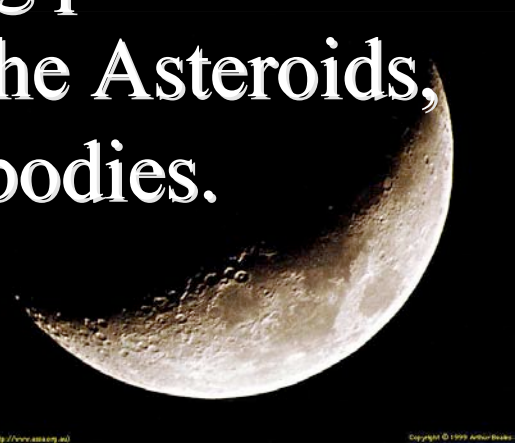
Origin of radio waves	Radio frequency *f*	Source in GEO	Source in orbit at L1 distance	Source still at L4 or L5
ELF	0.003 MHz	-27 dB	-15 dB	-14 dB
VLF	0.030 MHz	-37 dB	-25 dB	-23 dB
Jupiter's storm	20 MHz	-65 dB	-53 dB	-52 dB
Deuterium	327.384 MHz	-77 dB	-65 dB	-64 dB
Hydrogen	1420.406 MHz	-84 dB	-71 dB	-70 dB
Hydroxyl radical	1612.231 MHz	-84 dB	-72 dB	-71 dB
Formaldehyde	4829.660 MHz	-89 dB	-77 dB	-75 dB
Methanol	6668.518 MHz	-90 dB	-78 –dB	-77 dB
Water vapor	22.235 GHz	-96 dB	-83 dB	-82 dB
Silicon monoxide	42.519 GHz	-98 dB	-86 dB	-85 dB
Carbon monoxide	109.782 GHz	-103 dB	-90 dB	-89 dB
Water vapor	183.310 GHz	-105 dB	-92 dB	-91 dB

Next Steps in Exploring Deep Space

Suggestion by IAA Cosmic Study S1.1, titled "The Next Steps in Exploring Deep Space":

- Use the Earth-Sun L2 ONLY (and NOT the Earth-Moon L2) as a servicing station

- and as a Low-gravity launching platform for large spacecrafts to Mars, the Asteroids, and all the outer solar system bodies.



POLITICS and the PAC CREATION

- The "Outer Space Treaty" was signed in 1967.
- NO COUNTRY can "colonize" the Moon, Planets and Asteroids for that Country only!
- Back in 1967, however, it was hard to envisage a time when PRIVATE INVESTORS could reach the Moon by their own means.
- So no-one knows what will happen when some PRIVATE INVESTORS LAND ON THE MOON…

POLITICS and the PAC CREATION

- Will private investors stay away from the PAC?
- Maybe NOT!
- It is thus URGENT to reach some kind of INTERNATIONAL AGREEMENT…
- The U.N. COPUOS should APPROVE the PAC.

COPUOS briefed by author about PAC (United Nations, Vienna, June 10th, 2010)

POLITICS and the PAC CREATION

- The NEXT STEPS…
- One Country must raise the issue at the U.N.
- Then the U.N. turns to COPUOS…
- Then COPUOS turns to the IAA and IISL…
- Then PAC IS APPROVED BY THE U.N.

Thank you !